

board than those of Hansen, and so there is a better chance of correcting the errors, which no mortal can altogether escape. Next the constants are not stereotyped, and if it is necessary to change them the effect can be made visible; and for a searching piece of evidence, Prof. Brown has shown already that his calculations remove the last shred of disagreement between the calculated and observed motions of the moon's apse. Finally, in a recent analysis of the Greenwich observations back to 1750, Mr. P. H. Cowell has given a most striking verification of all Prof. Brown's coefficients.

When Prof. Brown constructs his tables there is an error Hansen fell into which he may be trusted to avoid. In order to improve the agreement with observation, Hansen introduced a certain empirical element. An empirical correction is better than nothing, but it cannot be too clearly recognised that until it is furnished with a theoretical basis it is no more than a mathematical *memoria technica*. Certainly its place is not in a set of tables, the sole function of which is to expose correctly and fully the consequences of a clear theory and definite elements, with the view of testing the one and amending the others.

R. A. S.

THE CONTROL OF THE GAS SUPPLY OF THE METROPOLIS.

THE notification of the metropolitan gas referees just issued differs in several respects from that for the preceding year, a change necessitated by the provisions of the London Gas Act, 1905. For some years past the London gas companies have been asking for the revision of their Acts, with reference more especially to the system of testing to which their gas is subjected. In the early days of gas supply, when there was free competition and the consumer had the choice of more than one company, no testing was regarded as necessary, but when, owing to the amalgamation and consolidation of the gas companies, the supply became a monopoly, a system of testing the purity and illuminating power of the gas was instituted. The whole of the arrangements for testing London gas, with the exception of one or two points specially laid down in some of the Acts, are left to the discretion of the gas referees, originally appointed under the City of London Gas Act, 1868. It was alleged by the companies that the requirements of the referees were too stringent and out of touch with the modern developments of gas manufacture. In January, 1904, a departmental committee of the Board of Trade was appointed to inquire and report as to the whole system of gas-testing in the metropolis. At the inquiry the committee heard evidence from the gas referees, and from representatives of the London County Council, the Corporation of London, and each of the three gas companies concerned. It is noteworthy that no actual consumer was heard, although on one of the most important points dealt with by the committee, the question of sulphur impurity, the committee in its report says, "It does not appear that any complaints are made by the inhabitants of other districts on the ground that the gas thus unpurified causes injury to health or is more destructive to articles such as leather, &c., than it is supposed to be in London."

The report of the committee was almost wholly favourable to the companies. The mode of testing for sulphuretted hydrogen is to be relaxed, a test lasting three minutes being substituted for one spread over 15 hours, and all sulphur compounds other than sulphuretted hydrogen may be, and henceforth will be, left in the gas. The evidence of the companies as to

the amount of sulphur impurity under the new conditions was to the effect that an average of 35 grains per 100 c.ft. or under might be expected, with the possibility of an occasional rise to 40, the maximum under the Acts just repealed being 17 grains in summer and 22 grains in winter. The figures for the amount of sulphur present in the gas supplied by the South Metropolitan Company during December last throw an instructive light on the value of this evidence, the weekly average increasing from 40.8 to 44.6 grains per 100 c.ft. with a single maximum of 61.3. On one occasion the Commercial Gas Company surpassed even this figure with a maximum of 70.2. It is clear, therefore, that the gas now to be supplied to London may contain about double the amount of sulphur contemplated by the departmental committee, and this is of interest in view of the fact that a Bill is now before Parliament promulgated by various provincial gas companies asking to be placed in the same position as the London companies as regards the removal of sulphur restrictions.

In one point the report of the departmental committee was favourable to the consumer. It recommended that the standard burner for testing the illuminating power of all qualities of gas should be the burner at present in use, the Sugg's London Argand No. 1, the gas to be burnt at the rate of five feet per hour. The gas referees in their present notification disregard this recommendation, and prescribe a burner devised by the engineer to the South Metropolitan Gas Company. The practical effect of this will be to increase the nominal illuminating power of the gas supplied by those companies having a 14-candle standard. It will be seen, therefore, that the new conditions are wholly favourable to the companies.

There remains one new point in the gas referees' notification, the prescription of a method of determining the calorific power of gas. The calorimeter, which has been devised by Mr. C. V. Boys, appears to be a distinct advance over its predecessors of the same type, and when it is installed in the testing stations systematic measurements of the calorific power of London gas will, for the first time, be on record, and will be available for the next battle on the gas question, calorific power *v.* illuminating power.

PROF. C. J. JOLY, F.R.S.

THE lamentable death of Prof. C. J. Joly at the early age of forty-one closes a career which was likely to influence favourably the mathematical side of astronomy. But his tenancy of the post of Royal Astronomer of Ireland and Andrews Professor in the University of Dublin was, alas! too short for him to make his individuality felt in the science with which he was connected by his occupancy of the chair, that has of late been held by Sir Robert Ball and Dr. Arthur Rambaut. The traditions of the office, and it may be the interrupted work of these astronomers, would naturally compel him for a time to follow certain definite lines which the previous occupants of the chair had approved. But his work in the department of pure and applied mathematics was of a high order and affords abundant evidence of originality and capacity.

From the time that Prof. Joly entered Trinity College, Dublin, his academic career was marked by his devotion to natural science, and mathematical scholarships and studentships were the natural preliminaries that led to a later fellowship. In this position he distinguished himself as a successful teacher of advanced science, but in 1897, when Dr. Arthur Rambaut was appointed to the office of Radcliffe observer, Dr. Joly

succeeded to the chair of astronomy, and his lectures and teaching were necessarily more limited.

Prof Joly will be best remembered by his loyalty to the memory of Sir William Hamilton, of whose "Manual of Quaternions" he prepared a new edition. He endeavoured to promote the study of this branch of mathematics in various ways, by his original writings, in which he sought to bring projective geometry within this special method of treatment, and by the support he gave to the International Association for Promoting the Study of Quaternions and Allied Systems of Mathematics. We are also indebted to him for the third edition of Preston's "Theory of Light," while many papers in the *Transactions of the Royal Irish Academy* testify to his industry and power.

Prof. Joly was elected a Fellow of the Royal Society in 1904; he acted as secretary to the Royal Irish Academy from 1902, and was a member of many learned societies. He was a delightful companion, with a memory well stored with anecdotes of Hamilton, of Airy, of Robinson, and many another worthy; as a teacher he had the power of interesting his class and awakening their energies, and all too soon he is removed from a circle which he loved, and a society that his abilities adorned. W. E. P.

NOTES.

SIR MOUNTSTUART E. GRANT-DUFF, G.C.S.I., F.R.S., who died in London on Thursday, January 11, at seventy-six years of age, will long be remembered by his "Notes from a Diary"—a series of fourteen volumes full of chatty reminiscences extending from January, 1851, to January, 1901. Many distinguished men of science, both at home and abroad, were met by the author during this period of fifty years, and in each of the volumes of his diary are preserved interesting anecdotes and pithy remarks made by his acquaintances in the scientific world. Sir Mountstuart was fond of natural history, and particularly of botany, to which he devoted much attention. The 117th volume of the *Botanical Magazine* was dedicated to him by Sir Joseph Hooker "as a slight acknowledgment of the valuable services which you rendered to botany and horticulture when Under-Secretary of State, first for India and then for the Colonies, and lately when Governor of the Madras Presidency." He was president of the Royal Geographical Society from 1889 to 1893, and a member of the Senate of the University of London in 1891. By his spirit of investigation and sympathetic interest in scientific work—attributes not possessed by many statesmen—Sir Mountstuart secured the kindly feelings of all who are concerned with the study of nature.

WE regret to see the announcement that Dr. H. J. P. Sprengel, F.R.S., the inventor of the mercury air-pump which bears his name, died on Sunday, at seventy-two years of age.

A MEMORIAL to the late Dr. George Salmon, F.R.S., Provost of Trinity College, Dublin, was unveiled on Friday, January 5, in the national cathedral of St. Patrick's, with which Dr. Salmon was officially associated during the best years of his life. An account of the ceremony appeared in the *Kensington Express* of January 5, from which we learn that the memorial consists of two windows in St. Peter's Chapel, the work of Mr. C. E. Kempe, depicting scenes in the career of St. Peter, and a medallion of Dr. Salmon, by Mr. A. Bruce-Joy, with a Latin inscription of which the following is a translation:—

NO. 1890, VOL. 73]

"That the name of George Salmon may abide in the memory of mankind this monument has been erected by his faithful friends and grateful pupils. Fellow of Trinity College, Dublin—afterwards Regius Professor of Divinity, and finally Provost, he was for thirty-three years Chancellor of this Cathedral Church. A mathematician both adroit and powerful, he probed with keen insight the beginnings of Christian history, and specially the origin of the New Testament Books; as teacher and councillor he was unwearied in the service of the Irish Church. Shrewd, courteous, serious, kindly. He was born in 1819, and died in 1904. The fear of the Lord is the distinction of wisdom, and before honour is humility."

A GIFT of 1000*l.* has been received by the Royal Botanic Society from a fellow of the society, Dr. Robert Barnes.

THE widow and children of the late Dr. von Siegle, of Stuttgart, have presented 50,000 marks in memory of the deceased to the chemical institute of the University of Tübingen.

PROF. EMIL FISCHER has been elected president of the German Chemical Society for this year. Prof. S. Gabriel, Berlin, and Prof. W. Städel, Darmstadt, have been appointed vice-presidents in succession to Profs. O. N. Witt and H. Caro, who are retiring, whilst Drs. F. Mylius and A. Bannon have undertaken the duties of the secretaryship in succession to Drs. C. Schotten and W. Will. The post of librarian to the society, which hitherto has been held by Prof. Gabriel, has yet to be filled by the president. The society's funds are estimated at 762,635 marks, whilst the A. W. von Hofmann fund has nearly reached 45,000 marks.

AT Christiania on December 29, 1905, there gathered together under the presidency of Mr. John Sebelien a number of men interested in questions of agriculture and scientific subjects to celebrate the acquisition of a national independence in the past year. A fund was opened for the purpose of fostering research in the subject of Norwegian agriculture, to which fund all Norwegians, both at home and abroad, are invited to subscribe. When the sum of 15,000 kr. (833*l.*) has been subscribed, it is proposed to invite prize essays on particular questions, and to reward Norwegian scientific work in certain branches of learning; and later still it is intended financially to aid research work in agricultural science directly.

A REUTER message from Naples states that on January 10 three streams of lava were pouring down Vesuvius on the side upon which is situated Cook's funicular railway. The railway was seriously damaged, and the lava had reached the lower station. At the same date Etna was also active, a large amount of volcanic ash being ejected from the principal crater.

THE Geological Society of London will this year make the following awards of medals and funds:—Wollaston medal to Dr. Henry Woodward, F.R.S.; Murchison medal to Mr. C. T. Clough; Lyell medal to Prof. F. D. Adams, of Montreal; Prestwich medal to Mr. W. Whitaker, F.R.S.; Wollaston fund to Dr. F. L. Kitchin; Murchison fund to Mr. H. Lapworth; Lyell fund to Mr. W. G. Fearnside and Mr. R. H. Solly; Barlow-Jameson fund to Mr. H. C. Beasley.

DURING this month and next an exhibition of studies and effects obtained by current methods of colour photography will be open at the office of the *British Journal of Photography*, 24 Wellington Street, Strand, W.C. The